1 APPLICATION OF THE RT-TESTER ON PHILIPS-SAMPLES

1.1 Determination of Material Data : Some examples

What has been done

Single Layers of ZnSiox (used as Buffer-Material in CDRW) have been measured, both Reflexion and Transmission Intensity.

The Method and Results

By Fitting R and T and using an Oscillator ansatz for the dielectric function, we obtained the refractive index of the material, which is about **n =2.1**, and **κ = 0**. This is in good agreement with Philips data (see table). The calculated shapes of R and T fit the measured data quite well (Figs.1, 2).

For sample 980225-01 the calculated thickness was 86.5 nm, which is slightly smaller than the proposed value of 90.0 nm. However, in the case of sample 980224-08, there was a big deviation between calculated (43 nm) and assumed layer thickness (60nm). This may be due to an error in labelling the samples.

1.2 Layer Stack Reconstruction

What has been done

The entire layer stack of CDRW has been measured and the measurement evaluated using the material data obtained in the previous step. By a fitting procedure for the Reflectance (the Transmittance is close to zero), we determined the layer thicknesses of the stack, assuming an Aluminium thickness of 100 nm, as noted in the table of Philips. The optical behavior is nearly independent of this parameter.

Results

The three fitted layer thicknesses were within the range of the proposed data: For buffer layer 1 on top the Polykarbonat substrate we obtained 83.6 nm, for the active Phase change layer 25.3 nm and for the second buffer layer beneath the reflector 26.0 nm. The good agreement between measurement and simulation is shown in Fig.3.
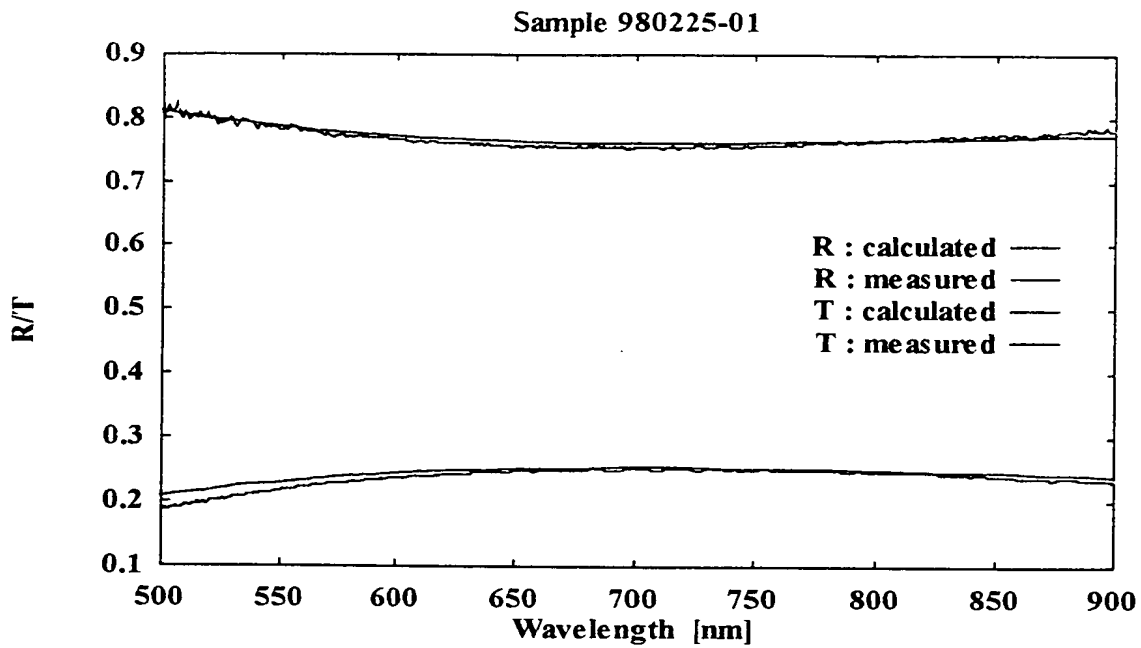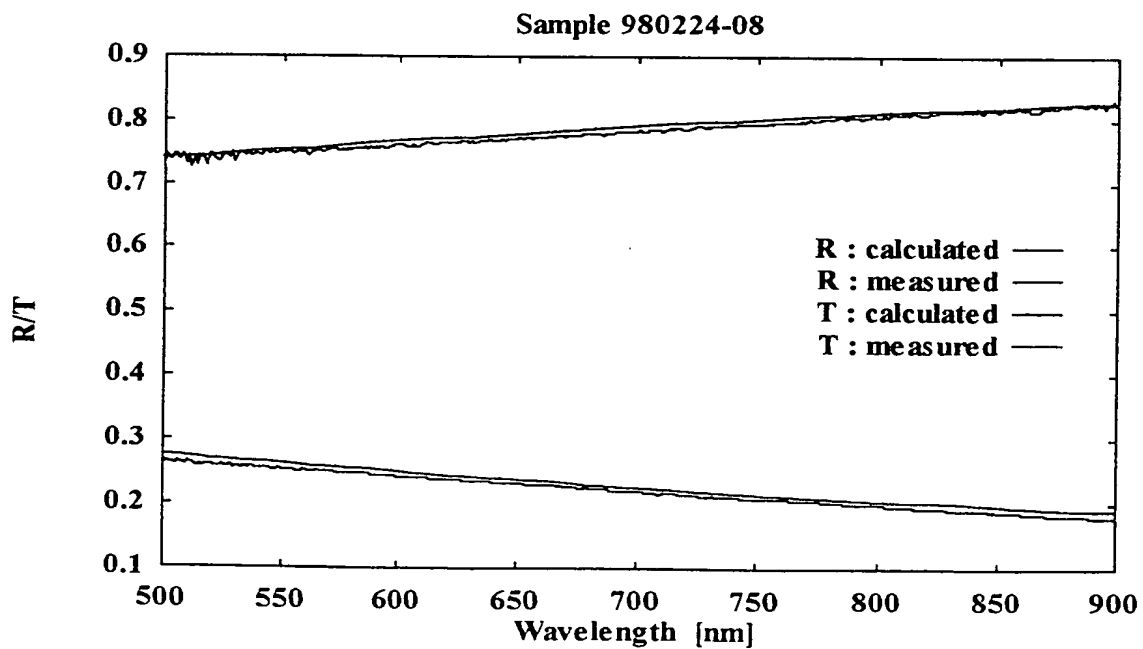
Fig.1

Sample 980225-01

R : calculated ——
R : measured ——
T : calculated ——
T : measured ——

Fig.2

Sample 980224-08

R : calculated ——
R : measured ——
T : calculated ——
T : measured ——

Fig. 3

Sample 980224-07